

Remarks

All of the claims are directed to crosslinkable flame retardant polyolefin insulation compositions having improved abrasion resistance. Claims 1-5 and 7-18 remain in the application. Claim 6 has been cancelled.

The claims have been amended so that they now more particularly point out Applicants' invention, namely, the use of a specific type of silane-containing base resin to achieve a significant and unexpected improvement in the abrasion resistance of the compositions.

Applicants acknowledge that silane polymers obtained by grafting or copolymerization are known and that various formulations based on the silane polymer systems have been used for wire and cable insulation. The basis of Applicants' invention is, however, the unexpected finding that by using a high density, bimodal silane-containing polyethylene base resin it is possible to markedly increase the abrasion resistance of flame retarded insulation compositions. To more clearly point this out, Claim 1, line 4, has been amended to specify the base resin is a high density, bimodal silane-containing polyethylene. Furthermore, the bimodality of blend (a)(i) and graft (a)(ii) is characterized by including the ratio of weight average molecular weight to number average molecular weight in Claim 1. The ratio of weight average molecular weight to number average molecular weight was previously recited in Claim 6 (now cancelled) and Claim 11 (now amended).

The Examiner has rejected the claims under 35 USC 103(a) as being unpatentable over the combination of Meverden, et al. (US Patent. 5,312,861), Wu, et al. (US Patent 4,797,323) and Scott (US Patent 3,646,155). The rejection is respectfully traversed and reconsideration requested. With regard to the rejection, reference is made in the bottom line of page 3 of the Office Action to "Horwatt, et al." Applicants assume this is an inadvertent oversight on the part of the Examiner and should read "Wu, et al." If this is not the case, the Examiner is requested to restate the rejection.

Meverden, et al., disclose random copolymers of ethylene and vinyltriethoxysilane and to filled moisture crosslinkable insulation compositions based thereon. Whereas the reference discloses the use of silanol condensation catalysts and blending with other olefin polymers, e.g., HDPE, there is no disclosure whatsoever to the use of bimodal resins of any type for any purpose or that any advantage may be achieved thereby.

Wu, et al., disclose crosslinkable compositions useful for insulation obtained using conventional polyolefin base resins, i.e., they do not contain silane functionality. Whereas the Wu, et al., compositions are crosslinkable, the crosslinking is accomplished utilizing peroxide curing agents. Such crosslinking systems are generally considered to be distinct from moisture curable silane polymer systems by those skilled in the art. Furthermore, while organic halogenated flame retardants such as decabromodiphenyl oxide are disclosed by Wu, et al., they are necessarily subjected to a “special treatment preparation procedure” (see Column 3, lines 31-32) which includes “ovenizing” the brominated compound with antimony oxide, fumed silica and a reactive silicone fluid. There is no disclosure or suggestion by Wu, et al., to the use of silane-containing base resins or bimodal resins of any type for their compositions.

Scott discloses graft copolymers of polyolefins, e.g., HDPE, and silanes and an improved process for effecting the crosslinking of the graft copolymers. The reference generally discloses the process is applicable for cross-linking polyethylene and copolymers of ethylene and minor amounts of propylene and/or butylenes; however, bimodal polyethylene resins are not disclosed for any purpose.

One of ordinary skill in the art would not, as the Examiner suggests, reasonably be motivated to combine the references since Wu, et al., deals with an entirely different type of crosslinking system than the moisture crosslinkable silane-based systems of Meverden, et al., and Scott. Even if Wu, et al., were considered with Meverden, et al., and Scott, which Applicants submit would not be the case, it would not render

Applicants' instantly claimed compositions obvious since Wu, et al., require the use of halogenated flame retardants which are modified by ovenizing with Sb_2O_3 , silica and a reactive silicone fluid.

Even more importantly, and contrary to the conclusion of the Examiner that all of the limitations of the polyolefin insulation of Applicants' invention are taught by the combination of references, none of the cited references disclose or even remotely suggest the use of bimodal resins of any type as a base resin or any other component in their adhesive blends. Where all of the references are totally silent as to the critical feature of Applicants' base resin, the combination of references cannot possibly render the claimed invention obvious.

Furthermore, there is no indication in any of the references that varying the molecular weight distribution of base resins can improve abrasion resistance or any other property of insulation compositions.

The unexpected improvement in abrasion resistance achieved with Applicants' instantly claimed compositions which utilize a bimodal silane-containing HDPE copolymer or blend is clearly shown in the application. Whereas a composition formulated using a base resin blend of an EVTEOS copolymer with a conventional (unimodal) HDPE withstood 317 cycles in the needle scrape adhesion test (ISO 6722, Section 9.2), a composition identically formulated using a base resin blend in accordance with the invention, i.e., a blend of EVTEOS and a bimodal HDPE, withstood 379 cycles in the same needle abrasion test – an increase of nearly 19%.

In view of the foregoing remarks and amendments to the claims, Applicants' submit all of the claims are patentable over the prior art and they respectfully request reconsideration and allowance.

Should the Examiner wish to discuss any aspect of the foregoing or any matter of form in an effort to advance the application toward allowance, he is urged to telephone the undersigned at the indicated number.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Gerald A. Baracka", with a long, sweeping horizontal line extending to the right.

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